

## **A theoretical framework for building online communities of practice with social networking tools**

Charlotte N. Gunawardena\*, Mary Beth Hermans, Damien Sanchez, Carol Richmond, Maribeth Bohley and Rebekah Tuttle

*University of New Mexico, 3601 University Se, Albuquerque, NM 87106, USA*

*(Received 30 May 2008; final version received 10 December 2008)*

This paper proposes a theoretical framework as a foundation for building online communities of practice when a suite of social networking applications referred to as collective intelligence tools are utilized to develop a product or solutions to a problem. Drawing on recent developments in Web 2.0 tools, research on communities of practice and relevant theories of learning, and the authors' own action research experience in collaborative knowledge creation utilizing Web 2.0 tools, this paper discusses a learning community's spiraling process as it moves from a given sociocultural context through discourse, action, reflection, and reorganization toward socially mediated metacognition.

### **Un cadre théorique pour construire des communautés de pratique en ligne en utilisant des outils de maillage social**

Cet article propose un cadre théorique sur lequel édifier des communautés de pratique en ligne lorsqu'on utilise, pour mettre au point un produit ou des solutions à un problème, une série d'applications destinées à la construction de réseaux humains et connues sous le nom d'outils d'intelligence collective. En s'appuyant sur les évolutions récentes des outils Web 2.0, sur les recherches sur les communautés d'usage et les théories de l'apprentissage pertinentes ainsi que sur l'expérience propre aux auteurs en matière de recherche action sur la création collaborative de savoir en utilisant le Web 2.0, le présent article examine le processus en spirale d'une communauté d'apprentissage qui part d'un contexte socio culturel donné et qui passe par le discours, l'action la réflexion et la réorganisation pour atteindre la métacognition reposant sur la médiation humaine.

### **Ein Theorierahmen für den Aufbau von "Online-Communitives of Practice" mit Hilfe von Anwendungen für Social Networking**

In diesem Beitrag wird ein theoretischer Rahmen als Grundlage für den Aufbau von Online-Praxis-Gemeinschaften vorgestellt, wenn eine Reihe von Social Networking Anwendungen, auf die man sich als kollektive Intelligenz-Tools beziehen kann, benutzt wird, um ein Ergebnis oder eine Problemlösung zu entwickeln. Wenn man den neuesten Entwicklungsstand bei den Web 2.0 tools mit einbezieht, die Forschung im Kommunikationsbereich, die relevanten Lerntheorien und die eigenen Forschungen und praktischen Erfahrungen des Autors in der Benutzung von Web 2.0-Anwendungen auf dem Gebiet der gemeinschaftlichen Wissensermittlung, belegt dieses Papier den spiralförmigen Prozess beim Bewegen von einem bestimmten soziokulturellem Kontext aus durch Diskurs, Aktion, Reflektion und Reorganisation hin zu sozial vermittelter Metaerkenntnis.

---

\*Corresponding author. Email: [lanii@unm.edu](mailto:lanii@unm.edu)

### Un marco teórico para la construcción de comunidades de práctica en línea con herramientas de creación de redes sociales

Este artículo propone un marco teórico como base para la construcción de comunidades de práctica cuando se utiliza una serie de aplicaciones sociales en redes (conocidas como herramientas de inteligencia colectiva) para desarrollar un producto o solucionar tal o tal problema. Basándose en las evoluciones recientes de las herramientas Web 2.0, en las investigaciones sobre las Comunidades de Uso y las teorías del aprendizaje más pertinentes así como en la experiencia propia de la investigación/acción por parte de los autores sobre la creación colaborativa de conocimiento a través del uso de herramientas Web 2.0, este artículo examina la evolución « en espiral » de una comunidad de aprendizaje que sale de un contexto socio cultural determinado y pasando por el discurso, acción, reflexión, alcanza la metacognición basada en la mediación humana.

**Keywords:** social networking; Web 2.0; communities of practice; socially mediated metacognition; collective intelligence

## Introduction

The evolution of the World Wide Web from Web 1.0 to Web 2.0 is creating subtle but profound changes in the ways human beings locate and access information, communicate with, and learn from each other. The changes in technologies are driving changes in human behavior, interactions, and knowledge acquisition. The paradigms for learning have already evolved beyond traditional classroom models to synchronous and asynchronous, interactive, and collaborative learning, which is further extended by Web 2.0 tools and social networking approaches. However, recent developments in Web 2.0 technologies are far outpacing the development of theoretical frameworks for their utilization in education and training.

According to Kamel Boulos and Wheeler (2007), “the second incarnation of the Web (Web 2.0) has been called the ‘Social Web’, because, in contrast to Web 1.0, its content can be more easily generated and published by users, and the collective intelligence of users encourages more democratic use” (p. 2). The tables below provide a comparison between the focus of Web 1.0 and 2.0 technologies and learning.

In both Web 1.0 and 2.0, technology is tied to human communication and learning.

### Definition of social networking

We define social networking as the practice of expanding knowledge by making connections with individuals of similar interests. In the Web 2.0 environment, social networking is linked to technological services and software that make it possible for people to communicate with others from anywhere, at any time. Social networking sites are online spaces that can be customized to a large extent by their users, providing space for personal profiles, which users complete in order to make connections with others.

Table 1. Comparison between the focus of Web 1.0 and 2.0 technologies.

Web 1.0	Web 2.0
<ul style="list-style-type: none"> <li>• Publishing</li> <li>• Content management systems</li> <li>• Directories (taxonomy)</li> <li>• Personal Websites</li> </ul>	<ul style="list-style-type: none"> <li>• Participation</li> <li>• Wiki</li> <li>• Tagging (“Folksonomy”)</li> <li>• Blogging</li> </ul>

Note: Adapted from O’Reilly (2005).

Table 2. Evolution of learning from Web 1.0 to 2.0.

Learning 1.0	Learning 2.0
<ul style="list-style-type: none"> <li>• Formal and structured learning</li> <li>• Instructor led, Web-based, virtual and blended</li> <li>• Command and control; top-down, push</li> <li>• Centralized content creation</li> <li>• Management hierarchy</li> <li>• Taxonomies</li> <li>• Scheduled, planned</li> <li>• Company-identified experts</li> <li>• Managed formal events</li> </ul>	<ul style="list-style-type: none"> <li>• Informal and collaborative learning</li> <li>• Blended, blogs, wikis, Q&amp;A, search</li> <li>• Bottom-up; peer to peer, pull</li> <li>• Grassroots content creation</li> <li>• Mentoring, knowledge networks</li> <li>• Tags</li> <li>• Real-time, just in time</li> <li>• Community identified experts</li> <li>• Enabled knowledge exchange</li> </ul>

Note: Adapted from Lambert (2008).

After reviewing social networking sites, Erlandson (2008) developed the following classification. Social networking refers to sites such as Facebook, MySpace, and LinkedIn, where users set up a profile, create formal connections to people they know, communicate, and share preferences and interests. A very popular social networking site that provides a 3-D virtual environment where users interact with each other through avatars is Second Life created by Linden Lab. Sites such as YouTube and blogs are classified as social publishing; Del.icio.us and Bibsonomy are categorized as social book marking; Folksonomy and Tag Clouds fall into the category of social cataloging. Of great interest to online educators and trainers is the wiki, referred to as a collective intelligence tool that enables collaborative editing of documents on the Web. A wiki is a website that users can customize with controls that resemble a word processor's interface. Combining wikis with several other social networking applications creates a powerful environment for communication and learning.

Thus, Web 2.0 tools foster interaction, collaboration, and contribution. An essential feature is user generated content enabling sharing, co-creating, co-editing, and co-construction of knowledge reflecting the collective intelligence of the users. Mason and Rennie (2008) point out the "gift culture" on the Web, where users contribute as much as they take in such sites as YouTube and Flickr.

We believe that the type of learning that Web 2.0 technologies are facilitating is challenging existing learning theories primarily because the theories were developed when wide-ranging online communication between people of different races, locations, and viewpoints was not possible. Mason and Rennie (2008) support this view citing Siemens' (2004) claim that Web 2.0 technologies have changed the learning landscape such that the three pillars of learning theory (behaviorism, cognitivism, and constructivism) are no longer adequate for describing how we learn with these tools. Therefore, it is necessary to develop new theoretical frameworks that extend existing knowledge about learning to explain the dimensions of interactions that Web 2.0 technologies are now facilitating.

### **Purpose**

The purpose of this paper is to attempt to develop a theoretical framework to understand learning among groups of individuals that utilize social networking applications to work towards a common goal. For the purpose of this paper, we define social

networking technology as tools that facilitate collective intelligence through social negotiation when participants are engaged in a common goal or a shared practice. Smith (1994) used the term collective intelligence to describe, “how groups of individuals can occasionally and under particular circumstances meld their thinking into a coherent whole” (p. 1). Web 2.0 applications such as wikis provide the technological support for groups to move toward collective intelligence in a learning environment, a shared space in which a group of individuals can develop community, discuss an issue of interest, and reflect on practice.

## Method

In order to develop a theoretical framework for understanding learning in social networking environments, we adopted two methods: a literature review of learning theories and action research of our own exploration of social networking tools as we developed into a community of practice (CoP) to compose this paper. Since literature is just emerging in this field, it was important for us to develop our knowledge and understanding of practice through our own interactions with each other using Web 2.0 tools.

We began with a consideration of Wenger, McDermott, and Snyder’s (2002) CoP model to understand the structure of social networking and went on to conduct a review of literature that examined sociocultural and related theories of learning. At the same time, we explored social networking through demonstration and practice with a wiki, del.icio.us, and blog sites as we developed as a learning community. As a result, we were able to analyze a variety of Web 2.0 tools to assess their utility for learning. The focus was on learning through interaction while utilizing the tools. Finally, we reflected on our own learning processes as we engaged in the co-construction of knowledge.

## CoP as a structure for online social networking

Wenger et al. (2002, p. 4) defined CoPs as, “groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis.” According to Wenger (1998), a CoP defines itself along three dimensions: what it is about – its joint enterprise as understood and continually renegotiated by its members; how it functions – mutual engagement that bind members together into a social entity; what capability it has produced – the shared repertoire of communal resources that members have developed over time (see also Wenger, 1998, pp. 73–84). The three structural elements of CoP described by Wenger et al. (2002) – (1) domain, (2) community, and (3) practice – helped us organize the theoretical frameworks identified as supporting learning in social networking environments. All three elements apply to social networking environments as well as to face-to-face CoPs. Wenger et al. note that when these three elements function well together, they make a CoP an ideal “*knowledge structure* – a social structure that can assume responsibility for developing and sharing knowledge” (p. 29).

## Domain

Social networking technologies present a forum for discussion and interaction. The domain represents common ground where participants share their ideas, knowledge,

and stories. The Appreciative Inquiry (AI) theory for organizational change, based on social constructionism and social constructivism frameworks, is founded on the Anticipatory Principle (Magruder Watkins & Mohr, 2001). The Anticipatory Principle identifies collective imagination and discourse about feelings as important resources for generating constructive change or improvement. It may be this Anticipatory Principle that draws people to the topic. As participants engage in the domain, a shared understanding can develop; in the best case, a domain creates personal meaning and strategic relevance (Wenger et al., 2002).

### ***Community***

“The community creates the social fabric of learning” (Wenger et al., 2002, p. 28). The community is a group of people who learn and interact together, building relationships that result in a feeling of belonging and mutual commitment (Wenger, 1998).

Social constructionist theory can be used to analyze the use of Web 2.0 technology for community building. Social constructionists believe that the world is shaped by the dialogue and discourse we have with one another. Social networking tools like wikis and blogs can help to build community through dialogue and conversation, selectively making sense of past and present experiences.

Together we create structures and images of what we anticipate for the future. According to social constructionist theory, our understanding of the world arises from our own shared construction of the world. Daily social interaction and relationships are the source of what is true for us. People who are curious about the lives of their peers regularly use MySpace and Facebook to create a shared worldview.

Given the centrality of culture to human life (Shuter, 1990; Vygotsky, 1978) and its role in mediated communication and learning, we searched for a definition of culture that would be appropriate for Web 2.0 social networking environments. We observed that online social networking is leading to the development of culture in its own right, often blurring the boundaries between the real and virtual worlds. Very often those who communicate online identify with multiple frames of reference and often subscribe to “third” or hybrid identities that are themselves fostered by the cultural flows facilitated by the Internet. Therefore, we adopted the definition of “idioculture” developed by Gary Alan Fine and cited by Cole and Engestrom (2007) as a functional definition of Web 2.0 culture:

An idioculture is a system of knowledge, beliefs, behaviors, and customs shared by members of an interacting group to which members can refer and that serve as the basis of further interaction. Members recognize that they share experiences, and these experiences can be referred to with the expectation they will be understood by other members, thus being used to construct a reality for the participants. (Fine, 1987, p. 125, cited in Cole & Engestrom, 2007)

### ***Practice***

Whereas the domain denotes the topic the community focuses on, the practice is the specific knowledge the community develops, shares, and maintains (Wenger et al., 2002). When collaborating using Web 2.0 technologies, users adjust to the new interactive technological environment, and they will do so either in ways that reveal native cultural values, or reflect the creation of new cultural norms and conventions. The nature of the tool that mediates communication impacts and alters their perceptions

of the communication process as well, and how they perceive their social roles. As Joinson (2003, pp. 2–3) observes “tools are more than just something to make a task easier. They change your way of thinking, of approaching a task (and indeed the nature of the task itself), and can reap unimagined wider social changes.” Vygotsky (1978, p. 29) referred to this as “mediation” and argued that when we interact with each other using tools we allow for the extension of human capabilities. Therefore, the social networking tools we use will change how we think, how we learn, and how we interact with each other.

Social networking technologies offer ways to participate in interactive dialogue and the means to conduct learning. Second Life, like many social networking sites, functions as a tool to “serve as the conductor of human influence on the object of activity; it is externally oriented; it must lead to changes in objects” (Vygotsky, 1978, p. 55). The change in the objects that social networking tools act upon may be our own knowledge processing that evolves as we interact within a technological environment.

Negotiation of meaning is “the process by which we experience the world and our engagement in it as meaningful” (Wenger, 1998, p. 53). Negotiation of meaning in a social networking environment takes place as individuals advance their knowledge of a particular subject or process, develop a community with a common history, and create a new cultural historical process. The interaction analysis model developed by Gunawardena, Lowe, and Anderson (1997) offers a framework for analyzing negotiation of meaning within a CoP.

Having analyzed online social networking within the CoP model, we next explore relevant learning theories and our own action research process as a CoP to understand learning in social networks.

### **Understanding learning in a CoP**

How does learning happen within the structural framework of a CoP? Lave and Wenger (1991, p. 100) state that “because the place of knowledge is within a community of practice, questions of learning must be addressed within the developmental cycles of that community.” In this section, we discuss the learning theories that played a role in our own learning process as a CoP.

Sociocultural and socio-constructivist approaches to learning (Vygotsky, 1978; Wertsch, 1991), provided the foundation for understanding learning in CoPs. Activity theory, which emerged from the work of Vygotsky, Leont’ev, and their colleagues in the Russian cultural–historical tradition assume that mental processes are situated in broader cultural and social contexts, and should be studied within these contexts. Activity theory is built upon several key concepts that are useful for understanding learning through collaboration in social networking environments. These include situated activity, mediating devices, higher and lower mental functions, and the zone of proximal development (ZPD). As a CoP, we first discussed our context and domain. We were a group of doctoral students working with an instructor in an advanced instructional technology course to develop this paper using social networking tools as well as face-to-face interactions. The focus was on student-generated content with the instructor acting as a partner in the learning process. We discussed our cultural frameworks, strengths, weaknesses, biases, and experiences and used a wiki as a mediating device to communicate our ideas on the domain. We recommend that a CoP use Facebook to generate a sense of social presence and community when learners are



distributed across geographical distances and use CommunityWalk, a community mapping site, for creating informational, interactive, and engaging maps of the context and location of community members, thereby creating a sense of the multiple cultural values and perspectives inherent within the community.

Distributed cognition, which draws from socio-constructivism, asserts that cognition, knowledge, and expertise are not merely a property of individual minds but are distributed across individuals, environments, external symbolic representations, tools, and artifacts (Pea, 1993). Salomon (1993) argues that “if cognitions are *distributed*, then by necessity they are also *situated*” (p. 114) as shown by Brown, Collins, and Duguid (1989), whose work has emphasized the need to embed knowledge construction in authentic contexts and distribute the capability required to do an activity across groups of peers, or a learner–mentor system. Distributed cognition emphasizes the social production of knowledge as a CoP works with social networking tools to arrive at a decided upon goal, just as we did in setting up a wiki and del.icio.us to negotiate our domain and practice. Legitimate peripheral participation concerns the process by which newcomers become part of a CoP and the transformative possibilities of being and becoming cultural–historical participants in the world (Lave & Wenger, 1991). As a community, we mentored one of our members who came from a different academic discipline on technology interfaces and functions. As she began to master the structure and interactive nuances of a social networking environment, she became a participating member of the CoP contributing a different academic perspective to our discussions using the technological tools.

### ***Zone of proximal development (ZPD)***

Social networking tools mediate between the knowledge of the individual and their contribution to knowledge building within the community. Learning to navigate an online social networking site challenges the novice and creates a ZPD: “the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers” (Vygotsky, 1978, p. 86). In an online environment, the ZPD is often scaffolded by tutorials and a help option that guides the user in correct navigation and procedures. Expert knowledge is situated within the social networking environment through help tools, tutorials, and interaction between participants of the network. Peer-to-peer mentoring as well as instructor-to-student mentoring became a key element of our CoP. A more experienced peer in social networking developed a tutorial on how to use wikis and del.icio.us and posted it for the benefit of the group.

### ***Group ZPD***

We propose that in addition to an individual ZPD scaffolded by technological tools, social networking sites create a collaborative ZPD among participants. Goos, Galbraith, and Renshaw (2002) distinguish between the traditional expert–novice interaction and interaction between individuals of equal status. They define this peer collaboration as “mutuality,” an interactive process encompassing varied reasoning and viewpoints that builds a shared understanding of the learning goal. As viewpoints are challenged within the group, individuals may clarify their reasoning, comparing their own ideas with others as we did in the wiki. Peer feedback on peer contributions

enhanced this learning process. Smith (1994) uses the term *group-mediated cognition* (GMC) to describe the form of situated thinking whereby the thinking of each individual is inevitably influenced by the thinking of the other members taking part in the activity, even if it is only to disagree. He notes that GMC takes place within basic cycles of interaction between the individual and the group. While some GMC processes are intellectual, others are social, but many include both intellectual and social dimensions. For example, in our CoP, an idea voiced by a member of the group was evaluated not just on its intellectual merits but also in accord with the community member's assessment of the person expressing it. As we engaged in the co-creation process using the wiki, blogs, and del.icio.us, we had to go through several iterations to arrive at GMC. Mason and Rennie (2008) point out that what is different about Web 2.0 collaborative technologies is that interaction, peer commentary, and collaborative research actually happen in a distributed global environment. "Knowledge is created, shared, remixed, repurposed, and passed along. In short, Web 2.0 is a research network as well as a learning network" (p. 10).

### ***Discourse***

Each CoP has its own discourse, which can affect how a person negotiates meaning. Gee (1996) defines discourse as a "socially accepted association among ways of using language, other symbolic expressions, and 'artifacts' of thinking, feeling, believing, valuing, and acting that can be used to identify oneself as a member of a socially meaningful group or 'social network'." Discourse is often synonymous with language. It is in examining discourse that we can see "how a community is shaped by language use and how language use shapes a community" (Creese, 2003, p. 55).

Learners come to a social networking environment with their own primary and secondary discourses; they are coming with their own languages, culture, and perceptions of gender; in addition, their secondary discourses are "those to which people are apprenticed as part of their socialization within various social, state, and national groups and institutions outside early home and peer group socialization" (Gee, 1996, p. 137).

Each discourse is shaped or, in Wenger's terminology, "negotiated" (Wenger, 1998, p. 52) to help shape meaning, and it is in analyzing these discourses that one can see how identity and power intertwine to negotiate meaning. A CoP has its own way of using language to determine meaning. Sharing perspectives with individuals from different primary discourses can enable understanding and respect of other cultures. Yet, it is the primary discourse that can determine just how much a learner is able to participate. The nuances of a language can confuse an issue or situation. In our development as a CoP, one of our first tasks was to engage in a definition of social networking, so that those who came from different language backgrounds and academic disciplines were on the same page and could start from the same foundation.

### ***Self-efficacy***

Participation in collaborative discourse can be influenced by an individual's self-efficacy. Bandura (1997) stresses the effect of an individual's perceived abilities on his or her behavior: "self-efficacy." The less confident a person is in his or her abilities, the less likely he or she is to engage in the behavior. Therefore, people are



oftentimes more influenced by their feelings of efficacy than by their expectations of outcomes. Self-efficacy is an important consideration for individuals who are new to online experiences. A complicated set of procedures for using social networking tools can discourage an Internet novice. Orienting newcomers to technology, tools, and conventions of discourse, and structuring participation for success can help them strengthen their efficacy and be more successful in their interactions.

### ***Metacognition***

Metacognition is defined by Driscoll (2000, p. 110) as “one’s awareness of thinking and the self regulatory behavior that accompanies this awareness.” Social networking technologies promote “active and engaged learning, where participants construct knowledge through social interaction and exploration” (Kamel Boulos & Wheeler, 2007). The power users have to manage knowledge at their own pace supports the self-regulated nature of metacognition (Michalsky, Zion, & Mevarech, 2007). Social networking technology also presents the opportunity for learners to reflect on their ideas, organize resources, provide evaluative feedback to others, and build communities of knowledge. Our collaborative development of this paper in a wiki is an example of social networking that facilitates metacognitive development.

Another example is Wikipedia, an online encyclopedia based on user-generated knowledge. Choi, Land, and Turgeon (2005) note that multiple perspectives can help learners identify differences in understandings and weaknesses in their explanations. The user can reflect on his or her own learning as a result of exposure to multiple perspectives, and engage in reflective practice, “reflection-in-action” (Schön, 1990).

Goos et al. (2002) reconceptualize metacognition as a social collaborative process. In their three-year study of patterns of student–student social interaction that mediated metacognitive activity in mathematics classes, they attempt to capture the interactive nature of the groups’ metacognitive monitoring and regulation highlighting the reciprocal character of collaborative interactions, where mutuality was expressed through a balance of utterances labeled as self-disclosure, feedback request, and other-monitoring. Smith (1994) in building a concept of collective intelligence as a form of computer-mediated collaboration, discusses the importance of metacognition – collective awareness and collective control. By developing thick, overlapping areas of shared knowledge, groups may be able to piece together a type of collective and foster distributed awareness that is sufficiently coherent to achieve a goal.

Having discussed a selection of learning theories that hold promise for understanding learning in CoPs, we now move on to propose a theoretical framework for understanding learning in social networking environments.

### **Spiraling toward socially mediated metacognition as a CoP: a theoretical framework**

In proposing a theoretical framework for collaborative learning with social networking tools, we draw on the learning theories we have discussed earlier and our own experience using social networking tools as a CoP to develop this paper. We first discuss the Web 2.0 tools a CoP can use to build a learning environment and then identify five phases in the learning process of a CoP: context, discourse, action, reflection, and reorganization that leads to the sixth phase, socially mediated metacognition, as seen in Figure 1. These phases can progress in multiple iterations as more users join

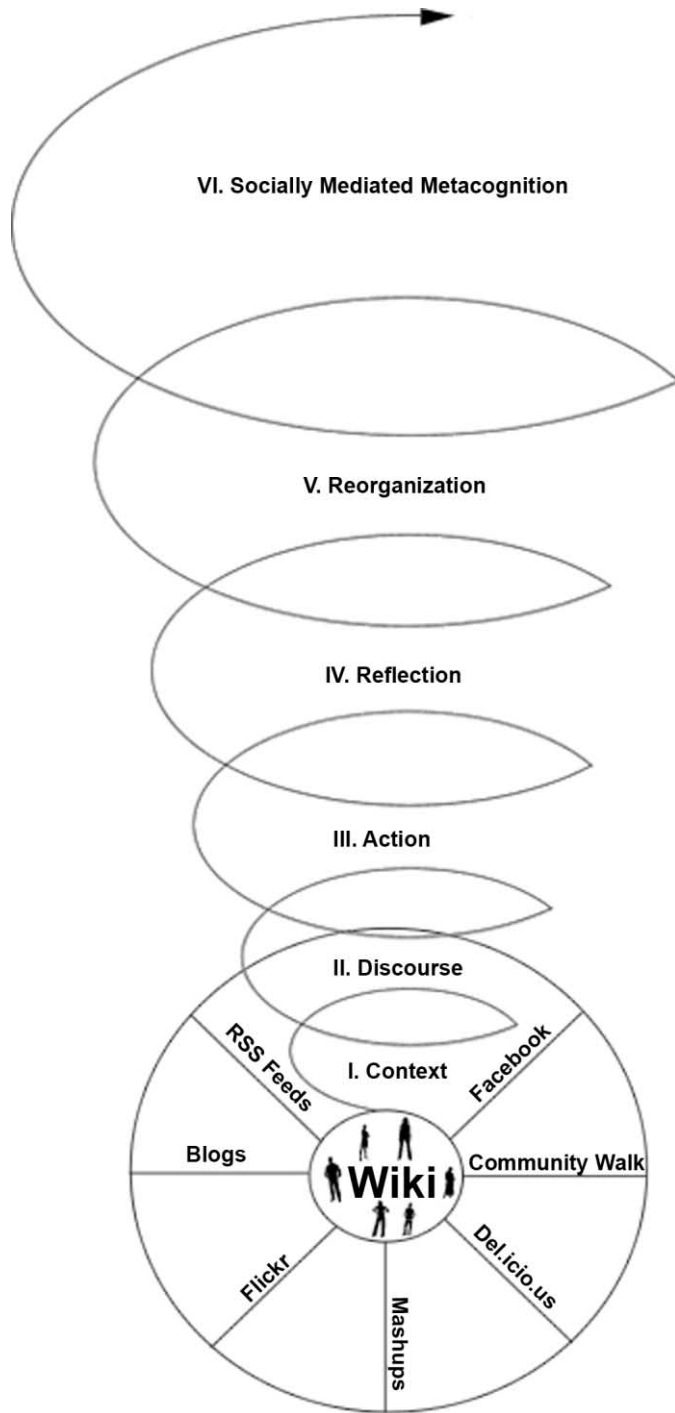


Figure 1. Social networking spiral.

and contribute to the wiki resulting in an evolving process of collective intelligence gathering.

In this framework, the spokes of the learning wheel revolve around a wiki. Wikis provide the setting for collaborative knowledge building and group metacognitive development. Each of the following Web 2.0 tools can be used in conjunction with wikis to enhance the quality of the learning process. Facebook enables social networking by connecting learners via personal profiles complete with photographs, and built-in methods of communicating. Interaction via profiles enhances social presence by adding a real context to the identity of each member of the CoP. This helps to create the context and the domain for the CoP. Moore (2008) has noted that participants may feel discomfort in achieving a balance between one's work identity and a more personal identity within social spaces such as Facebook. Therefore, consideration must be given to the cultural backgrounds of the members and the level of comfort with self-disclosure and expression of identity in Facebook. CommunityWalk creates a visual tracking system by identifying the location of users thus adding to social presence. Mapping may also be used to identify places of research as in a field study. Mashups provide users with the ability to create comprehensive bodies of knowledge by combining the resources of various sites, which can easily be compared and contrasted.

Del.icio.us keeps a record of references built through active participation. Learners can post their research links at the site as well as descriptions. Del.icio.us also offers users the ability to organize links into categories that they define as well as share their finds with others. Folksonomy or tagging, a basic function of sites such as del.icio.us and YouTube, facilitate knowledge management. Tagging essentially provides users with a method of organizing the knowledge they build by creating textual tags, which they attach to any given resource. As users create tags for their resources they are automatically organized by the system or website, and thus provide new and existing users with a method of navigating the database.

Blogs can act as personal journals of learning, as participants express their views, challenges, and reflections on the topic of research. This is a good place for individual metacognitive analysis. Blogs can also function as a group journal of learning and exploration. Flickr can act as a visual reference for sharing photos during field and qualitative research. In addition, it can function as a knowledge repository for graphics because it integrates tagging functionality with the ability to create photo albums. RSS (Rich Site Summary) feeds will keep the CoP updated on changes to frequently visited websites.

Having created the virtual learning environment with Web2.0 tools, we next discuss the phases in the learning process of a CoP.

### ***Context***

We propose that the process of collective intelligence creation in social networking environments initiates in context, the context of the site and the context of individuals using the site. "Most knowledge is an interpretation of experience, an interpretation based on schemas, often indiosyncratic at least in detail, that both enable and constrain individuals' processes of sense-making" (Resnick, Levine, & Teasley, 1991, p. 1).

### ***Discourse***

Each discourse is shaped or in Wenger's terminology, "negotiated" (Wenger, 1998, p. 52), to help shape meaning, and it is in analyzing these discourses that one can see

how identity and power intertwine to negotiate meaning (Barton & Tusting, 2005). As a CoP, we developed our own way of using language to determine meaning. An idio-culture formed as participants brought their life experience, knowledge, and insights to the group through discourse. Negotiation of meaning reinforced the strength of the interaction as a common history began to emerge and members were motivated to contribute.

### ***Action***

The action phase initiates the process of socially mediated cognition. Participants identify a learning goal and through tool use connect with others that share the goal, agreeing to tasks to accomplish it. In order to develop this paper we came together as a community and identified the goal of investigating learning in a social networking environment. Each contributor identified learning theories that support group construction of knowledge and discussed them. Collective intelligence was mediated by the wiki and other Web 2.0 tools as researchers posted their findings and negotiated meaning.

### ***Reflection***

The reflection phase is characterized by the interaction of personal experience and group thinking. This phase focuses on the consideration and integration of unfamiliar points of view. As an action research group, we embodied this step in the process by reviewing the wiki postings and discussing the relevance of the learning theories proposed. Here it is important to note that the wiki facilitated reflection because it provided a concrete historical documentation of our learning process. References to theories were book marked at a del.icio.us site linked to the wiki. The resulting change in attitude and understanding occurred on an individual as well as group level.

### ***Reorganization***

The reorganization phase follows the reflective process as members bring new understanding and insight to advance the shared goal. Participants adjust meanings and content within the social networking environment. This phase is aligned to the social constructionist process and is characterized by the synthesis of historic and novel perspectives. Mediated by interactive technology, the process of shared meaning advances, participants reflect on and adjust their understanding, and a concrete expression of shared metacognition is revealed. During the process of creating this paper, the group used what it learned from the previous two steps and aligned and organized theories to explain the learning goal. New tasks were agreed upon and a synthesis of the research began with a second iteration of action, reflection, and reorganization.

### ***Socially mediated metacognition***

The previous five phases from context through discourse to action, reflection, and reorganization led to socially mediated metacognition where we as a CoP were able to mutually reflect on our reasoning and developmental process as a group. A key feature of this peer-to-peer learning was mutuality – the reciprocal process of exploring each other's reasoning and viewpoints in order to construct a shared understanding. In

addition, peer-to-peer mentoring enhanced mutuality and established a “collaborative zone of proximal development” (Goos, Galbraith, & Renshaw, 2002, pp. 197–198) in our CoP. Goos et al. have noted that “collaborative metacognitive activity proceeds through offering one’s thoughts to others for inspection, and acting as a critic of one’s partner’s thinking” (p. 207). Our wiki’s history function facilitated socially mediated metacognition by enabling us to reflect on our development process as a group, as we critiqued each version of the paper edited by group members. We were able to generate reflective feedback through blogs and the comments function of the wiki. The wiki and the blogs captured the interactive nature of our group’s metacognitive monitoring and regulation. Our mutual reflection on our group learning and development process, Web 2.0 tool use, and the worthiness of our approaches to achieving the group goal facilitated socially mediated metacognition.

## Conclusion

We have proposed a theoretical framework to explain the collaborative learning process in a CoP that interacts with social networking tools, and have ourselves taken the journey toward understanding this process during the creation of this paper. This process ultimately resulted in a shared understanding of learning theories that influence learning in social networking environments, and application of these theories for learning design. We would like to close with a personal reflection from one researcher who grew from a novice to an expert in the process:

Utilizing social networking technologies like the wiki and social bookmarking to create this paper proved to be very useful to support learning mostly because of how well they facilitated collaboration between members of our class. It is true that resources can be shared easily via email; however, the wiki and social bookmarking provided a space where the exchange of knowledge occurred. That space enhanced engagement and learning because it facilitated the creation of a common secondary discourse.

## References

- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Barton, D., & Tusting, K. (2005). *Beyond communities of practice: Language, power, and social context*. New York: Cambridge University Press.
- Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher*, 18(1), 32–42.
- Choi, I., Land, S.M., & Turgeon, A.J. (2005). Scaffolding peer-questioning strategies to facilitate metacognition during online small group discussion. *Instructional Science*, 33, 483–511.
- Cole, M., & Engestrom, Y. (2007). Cultural-historical approaches to designing for development. In J. Valsiner & A. Rosa (Eds.), *The Cambridge handbook of sociocultural psychology* (pp. 484–507). New York: Cambridge University Press.
- Creese, A. (2003). Language, ethnicity and the mediation of allegations of racism: Negotiating diversity and sameness in multilingual school discourses. *International Journal of Bilingual Education and Bilingualism*, 6(3–4), 221–236.
- Driscoll, M.P. (2000). *Psychology of learning for instruction* (2nd ed.). Needham Heights, MA: Allyn & Bacon.
- Erlandson, J. (2008). *Web 2.0 social software*. Unpublished manuscript, University of New Mexico, Albuquerque, New Mexico.
- Gee, J.P. (1996). *Social linguistics and literacies: Ideology in discourses*. New York: Routledge Falmer Press.
- Goos, M., Galbraith, P., & Renshaw, P. (2002). Socially mediated metacognition: Creating collaborative zones of proximal development in small group problem solving. *Educational Studies in Mathematics*, 49(2), 193–223.

- Gunawardena, C.N., Lowe, C.A., & Anderson, T. (1997). Analysis of a global online debate and the development of an interaction analysis model for examining social construction of knowledge in computer conferencing. *Educational Computing Research*, 17, 397–430.
- Joinson, A.N. (2003). *Understanding the psychology of Internet behavior: Virtual worlds, real lives*. Hampshire: Palgrave Macmillan.
- Kamel Boulos, M.N., & Wheeler, S. (2007). The emerging Web 2.0 social software: an enabling suite of sociable technologies in health and health care education. *Health Information and Libraries Journal*, 24, 2–23.
- Lambert, A.G. (2008, April). Future of learning: Everything you wanted to know about Web 2.0. *Chief learning officer*. Retrieved October 20, 2008, from <http://www.clomedia.com/events/Webinars/2008/March/191/index.php>
- Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge, UK: Cambridge University Press.
- Magruder Watkins, J., & Mohr, B.J. (2001). *Appreciative Inquiry: Change at the speed of imagination*. San Francisco, CA: Jossey-Bass.
- Mason, R., & Rennie, F. (2008). *E-learning and social networking handbook*. New York: Routledge.
- Michalsky, T., Zion, M., & Mevarech, Z.R. (2007). Developing students' metacognitive awareness in asynchronous learning networks in comparison to face-to-face discussion groups. *Educational Computing Research*, 36(4), 395–424.
- Moore, M.G. (2008). Editorial: Continuing thoughts on social networking. *The American Journal of Distance Education*, 22(3), 127–129.
- O'Reilly, T. (2005, September 30). *What is Web 2.0?: Design patterns and business models for the next generation of software*. Retrieved October 20, 2008, from <http://www.oreilly-net.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html>
- Pea, R.D. (1993). Practices of distributed intelligence and design for education. In G. Salomon (Ed.), *Distributed cognitions: Psychological and educational considerations*, (pp. 47–86). Cambridge, UK: Cambridge University Press.
- Resnick, L.B., Levine, J.M., & Teasley, S.D. (1991). *Perspectives on socially shared cognition*. Washington, D.C.: American Psychological Association.
- Salomon, G. (1993). No distribution without individual's cognition: A dynamic interactional view. In G. Salomon (Ed.), *Distributed cognitions: Psychological and educational considerations*, (pp. 111–138). Cambridge, UK: Cambridge University Press.
- Schön, D.A. (1990). *Educating the reflective practitioner*. San Francisco, CA: Jossey-Bass.
- Shuter, R. (1990). The centrality of culture. *The Southern Communication Journal*, 55, 237–249.
- Smith, J.B. (1994). *Collective intelligence in computer-based collaboration*. Hillsdale, NJ: Lawrence Erlbaum.
- Vygotsky, L.S. (1978). *Mind in society: The development of higher psychological processes* (M. Cole, V. John-Shteiner, S. Scribner, & Souberman, Eds.). Cambridge, MA: Harvard University Press.
- Wenger, E. (1998). *Communities of practice. Learning, meaning, and identity*. Cambridge, UK: Cambridge University Press.
- Wenger, E., McDermott, R., & Snyder, W.M. (2002). *Cultivating communities of practice. A guide to managing knowledge*. Cambridge, MA: Harvard Business School Press.
- Wertsch, J.V. (1991). *Voices of the mind. A sociocultural approach to mediated action*. Cambridge, MA: Harvard University Press.



Copyright of Educational Media International is the property of Routledge and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.